ABSTRACT

The invention is an algorithmic method, or a computer implementation thereof, which *synthesizes connectivities*. In its prototypical form, the invention *computes pairwise channels for an arbitrary number of nodes, minimizing both latency and the cost of channels, such that all, or nearly all, healthy nodes remain connected, despite a prescribed number or proportion of failures in channels and/or nodes*. The invention also solves a similar problem, where minimum latency is replaced or augmented by maximum throughput. In general, channels may bear a non-uniform *cost*, nodes are assigned a *value*, each channel or node has a corresponding *latency* and *capacity*, and fault patterns may be probabilistic or deterministic. In particular, the invention optimizes the connectivity of large numbers of computers, perhaps dynamically self-organizing. Beneficial applications include the design and operation of self-healing, fault tolerant multicomputers and wired networks, as well as wireless networks having little or no dependence on central antennae.